AD-A121 558 NONRANDOM BEHAVIOR IN FIELD WAVE SPECTRA AND ITS EFFECT ... ON GROUPING OF HIGH WAVES(U) COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA E F THOMPSON AUG 82

UNCLASSIFIED CERC-TR-82-2 F/G 8/3 NL

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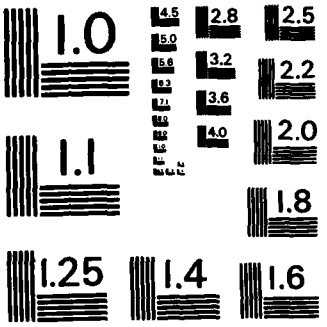

After completion of SMOOTH, the times and elevations of major peaks and valleys are stored in the first ITEMS elements of EXTIM. The value of ITEMS has been reduced in accordance with the number of small peaks and valleys eliminated. Since the smoothing algorithm cannot work properly at the end of a record, the last few points are usually accepted regardless of whether or not they satisfy the acceptance criteria. Thus, the last six elements in EXTIM may not represent major peaks or valleys and should either be checked or categorically eliminated.

A complete list of subroutine SMOOTH with comments is provided in Figure C-2.

```
      SUBROUTINE SMOOTH (FURST, ITEMS)

C        SUBROUTINE SMOOTH TAKES A RECORD OF PEAKS AND VALLEYS AND
C          ELIMINATES INCONSEQUENTIAL PEAKS AND VALLEYS, THE ELIMINATION
C          CRITERIA ARE A MINIMUM DIFFERENCE BETWEEN PEAK AND VALLEY
C          ELEVATIONS (HMIN) AND A MINIMUM HORIZONTAL SPACING (BE IT
C          TIME, POSITION, ETC) BETWEEN PEAK AND VALLEY (CHP).
C        INPUT PARAMETERS ARE DEFINED AS FOLLOWS:
C     FURST = STARTING TIME
C     ITEMS = TOTAL NUMBER OF EXTREME VALUES (INCLUDES TIME AND
C                ELEVATION VALUES)
C     CHP = CRITICAL HALF PERIOD
C     HMIN = MINIMUM HEIGHT TO BE CONSIDERED
C     EXTIM(ODD) = TIME
C     EXTIM(EVEN) = EXTREME ELEVATION ASSOCIATED WITH EXTIM(EVEN-1) VALUE
C                OF TIME
      COMMON /SHIFT/ EXTIM(100)
C        SET VALUES OF CHP AND HMIN TO BE USED
      DATA CHP, HMIN / 0.00, 3.0 /
C        INITIALIZE VARIABLES AND FIND STARTING POINT FOR PROCESSING
 1503 IITEMS=ITEMS
      J=1
      ITEM7=ITEMS-7
      DO 1502 I=1,IITEMS,2
      ISAVE=I
      IF(EXTIM(I).GE.FURST) GO TO 1504
      J=J+2
      ITEMS=ITEMS-2
 1502 CONTINUE
 1504  ISTART=ISAVE
C*************************************************************************

C        BEGIN MAIN PROCESSING LOOP
      DO 1520 I=ISTART,ITEM7,2
      L=I
      IF(ISTART.GT.ITEM7)GO TO 1520
      IF(EXTIM(I)+CHP.GT.EXTIM(I+2))GO TO 1511
      IF(ABS(EXTIM(I+1)-EXTIM(I+3)).LT.HMIN)GO TO 1511
C     IF NO TRANSFER, THIS EXTREME ACCEPTED
      EXTIM(J)=EXTIM(I)
      EXTIM(J+1)=EXTIM(I+1)
      J=J+2
      GO TO 1520
C     WHEN THE NEXT INSTRUCTION IS REACHED, ONE HIGH AND ONE LOW WILL
C                BE DELETED
 1511 IF(EXTIM(I+1).GT.EXTIM(I+3))GO TO 1516
C     IF NEXT INSTRUCTION IS USED, THIS IS A LOW
      IF(EXTIM(I+5).GT.EXTIM(I+1))GO TO 1512
      IF(EXTIM(I+3).GT.EXTIM(I-1))GO TO 1513
      GO TO 1517
 1512 IF(EXTIM(I+3).GT.EXTIM(I+7))GO TO 1519
      GO TO 1518
C     WHEN NEXT INSTRUCTION IS USED, THIS IS A HIGH
 1516 IF(EXTIM(I+5).GT.EXTIM(I+1))GO TO 1515
      IF(EXTIM(I+7).GT.EXTIM(I+3))GO TO 1519
      GO TO 1518
 1515 IF (EXTIM(I+3).GT.EXTIM(I-1))GO TO 1517
      GO TO 1518
C        SET THE VALUE OF ICASE
 1518 ICASE=1
      GO TO 1521
 1517  ICASE=2
      GO TO 1521
```

Figure C-2. List of subroutine SMOOTH (from Thompson, 1980).

```
 1518  ICASE=3
       GO TO 1521
 1519  ICASE=4
 1521  J1=I-2
       J2=I+7
C         DELETE ONE HIGH AND ONE LOW ACCORDING TO THE VALUE OF ICASE
       GO TO(1522,1523,1524,1525)ICASE.
C      STORAGE PLAN A
 1522 EXTIM(J-2)=EXTIM(I-2)
       EXTIM(J-1)=EXTIM(I-1)
       EXTIM(J)=EXTIM(I)
       EXTIM(J+1)=EXTIM(I+1)
       EXTIM(J+2)=EXTIM(I+6)
       EXTIM(J+3)=EXTIM(I+7)
       GO TO 1526
C      STORAGE PLAN B
 1523  EXTIM(J-2)=EXTIM(I-2)
       EXTIM(J-1)=EXTIM(I-1)
       EXTIM(J)=EXTIM(I+4)
       EXTIM(J+1)=EXTIM(I+5)
       EXTIM(J+2)=EXTIM(I+6)
       EXTIM(J+3)=EXTIM(I+7)
       GO TO 1526
C      STORAGE PLAN C
 1524  EXTIM(J-2)=EXTIM(I+2)
       EXTIM(J-1)=EXTIM(I+3)
       EXTIM(J)=EXTIM(I+4)
       EXTIM(J+1)=EXTIM(I+5)
       EXTIM(J+2)=EXTIM(I+6)
       EXTIM(J+3)=EXTIM(I+7)
       GO TO 1526
C      STORAGE PLAN D
 1525  EXTIM(I+6)=EXTIM(I+2)
       EXTIM(I+7)=EXTIM(I+3)
       EXTIM(J-2)=EXTIM(I-2)
       EXTIM(J-1)=EXTIM(I-1)
       EXTIM(J)=EXTIM(I)
       EXTIM(J+1)=EXTIM(I+1)
       EXTIM(J+2)=EXTIM(I+2)
       EXTIM(J+3)=EXTIM(I+3)
       K1=I+4
       K2=I+10
 1526  J1=J-2
       J2=J+3
       ITEMS=ITEMS-4
       ISKIP=I+8
       J=J+4
       GO TO 1504
 1520  CONTINUE
C         END MAIN PROCESSING LOOP
C*************************************************************************
       J=J-1
       IF(I-2.EQ.ITEMT)L=I
 1530 IF(L.GT.IITEMS)GO TO 1540
       J=J+1
       EXTIM(J)=EXTIM(L)
       L=L+1
       GO TO 1530
 1540 CONTINUE
       ITEMS=J
C         IF THERE WERE ANY DELETIONS IN THIS PASS REPROCESS ALL REMAINING
C                   HIGHS AND LOWS TO MAKE FURTHER DELETIONS IF NEEDED.
       IF(IITEMS.GT.ITEMS)GO TO 1503
       RETURN
       END
```

Figure C-2. List of subroutine SMOOTH (from Thompson, 1980).--Continued

APPENDIX D

PLOTS OF PHASE VERSUS FREQUENCY FROM MRS ANALYSIS

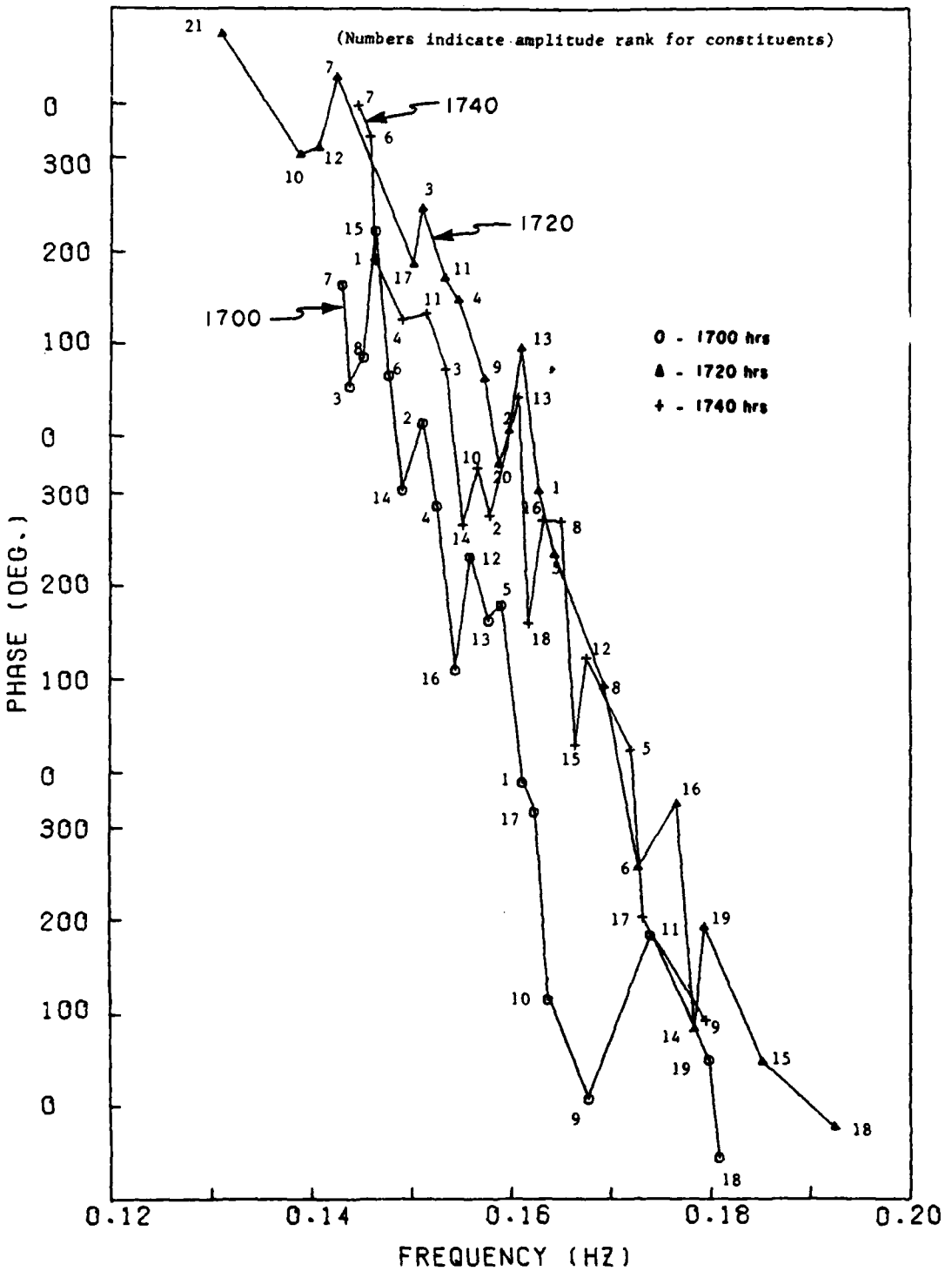

Figure D-1. South Haven, 1700 to 1800 e.s.t., 1,024-second records analyzed. Starting time of record is noted beside each curve.

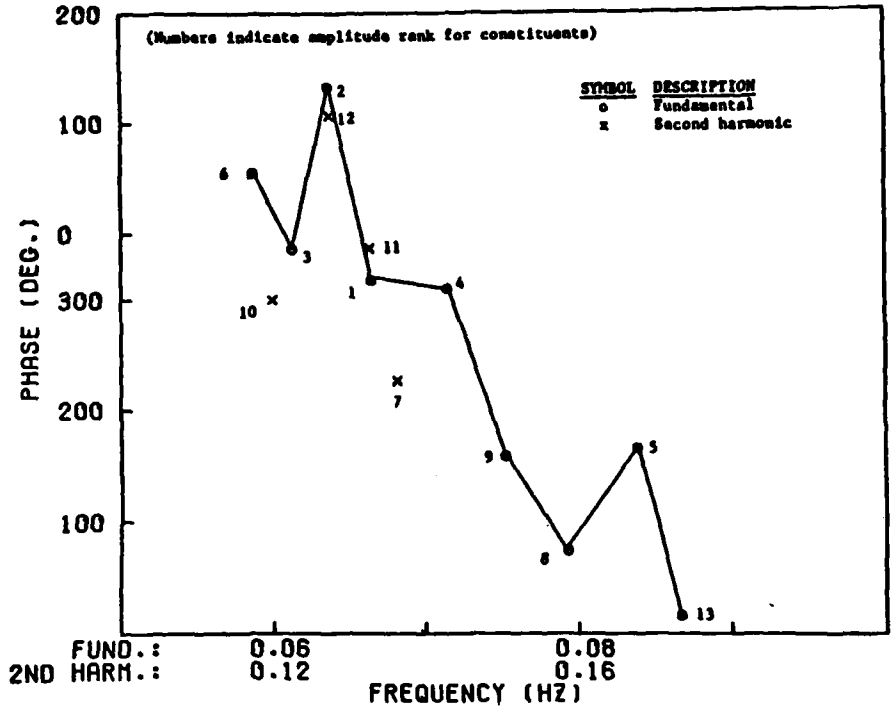

Figure D-2. Columbia Light, 1300 to 1308.5 P.d.t., 512-second record analyzed.

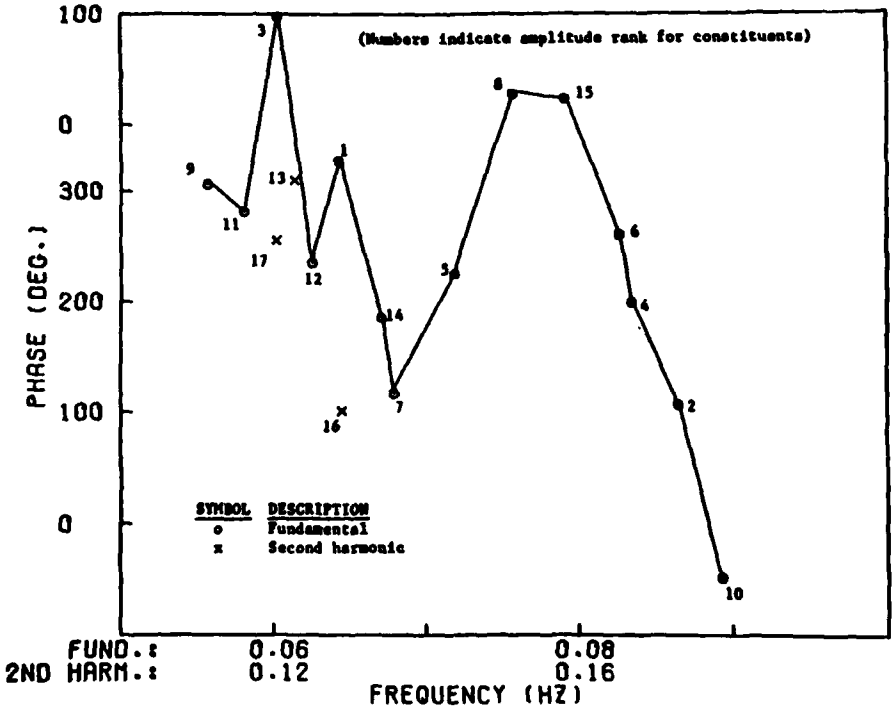

Figure D-3. Columbia Light, 1308.5 to 1317 P.d.t., 512-second record analyzed.

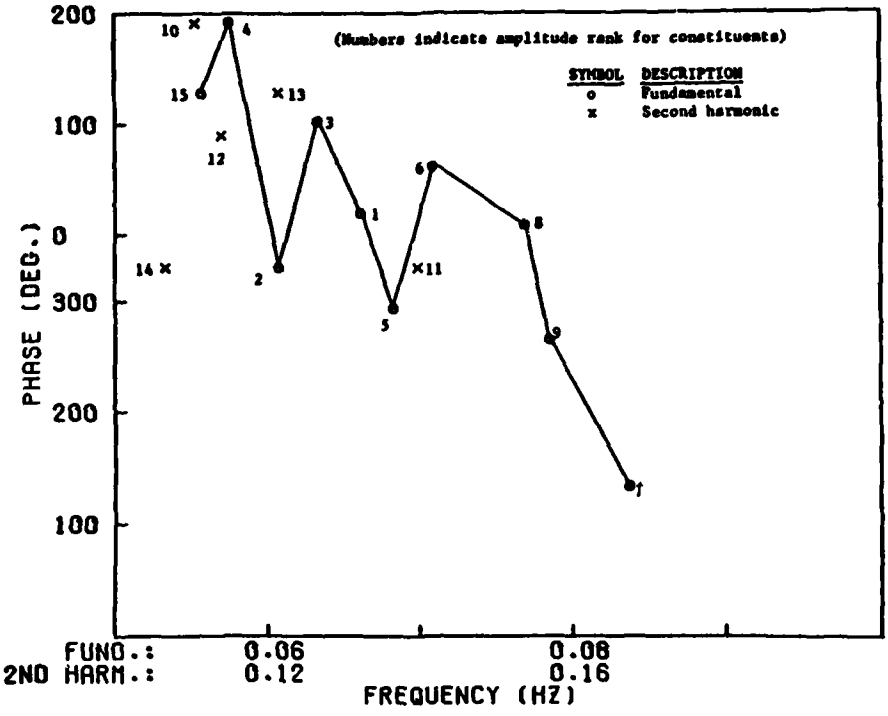

Figure D-4. Columbia Light, 1408.5 to 1417 P.d.t., 512-second record analyzed.

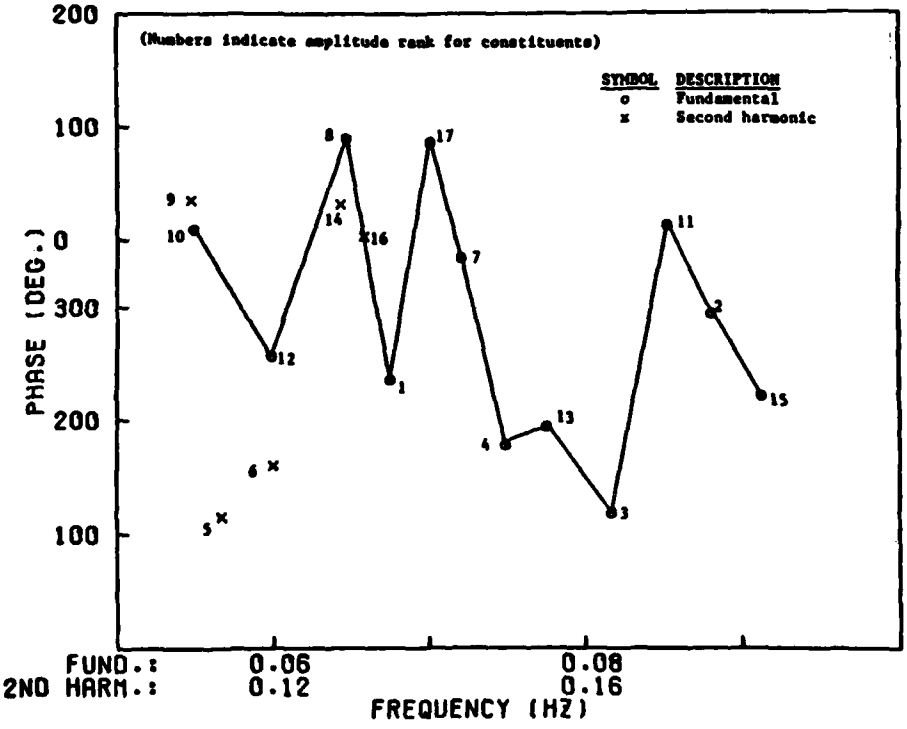

Figure D-5. Columbia Light, 1500 to 1508.5 P.d.t., 512-second record analyzed.

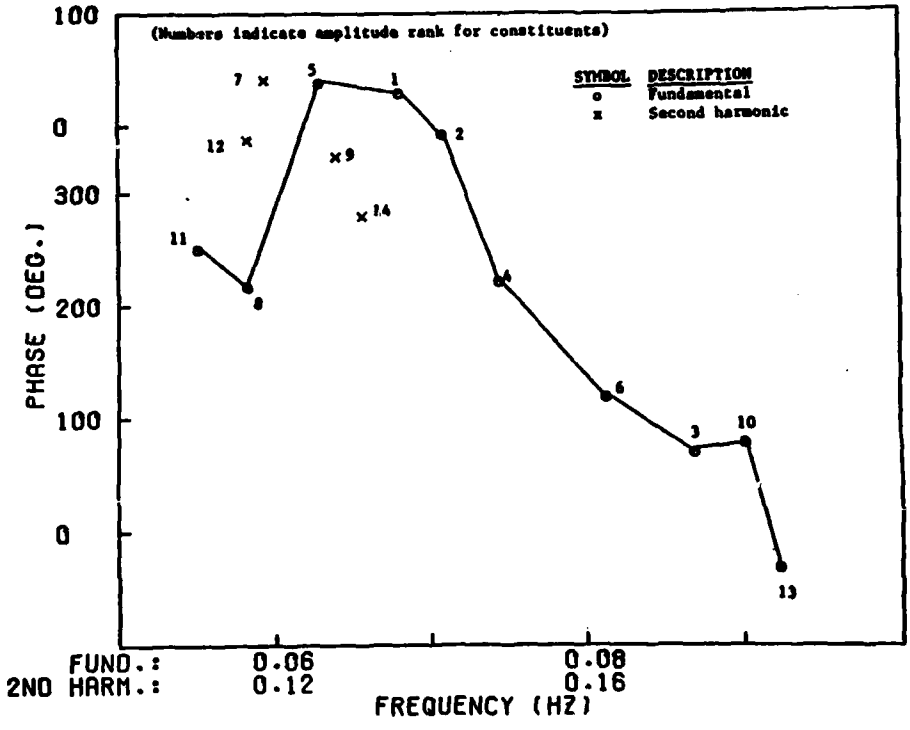

Figure D-6. Columbia Light, 1508.5 to 1517 P.d.t., 512-second record analyzed.

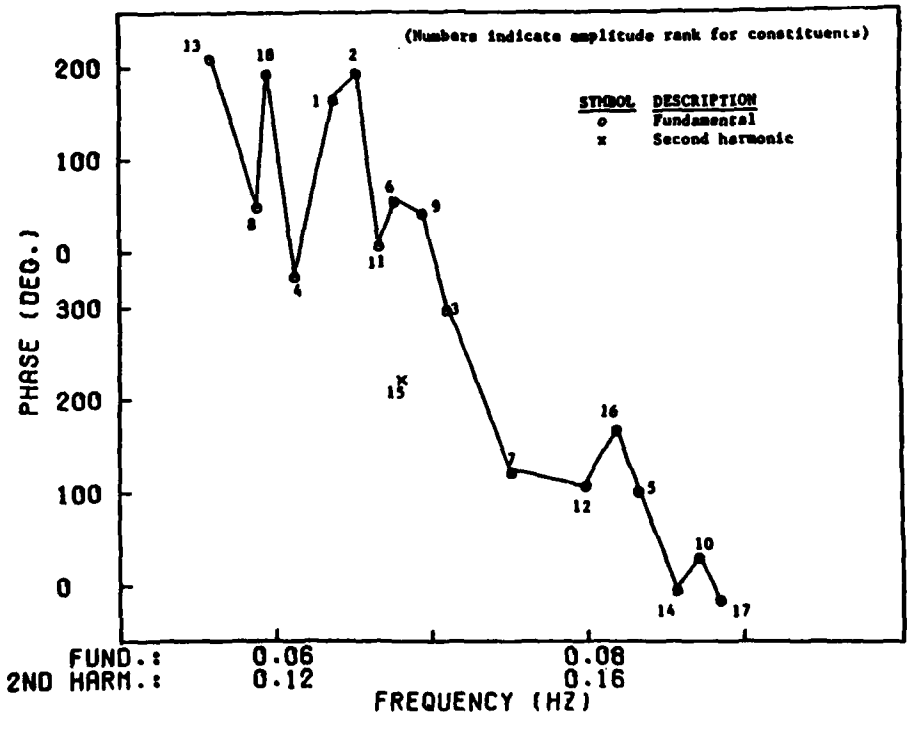

Figure D-7. Columbia Light, 1300 to 1317 P.d.t., 1,024-second record analyzed.

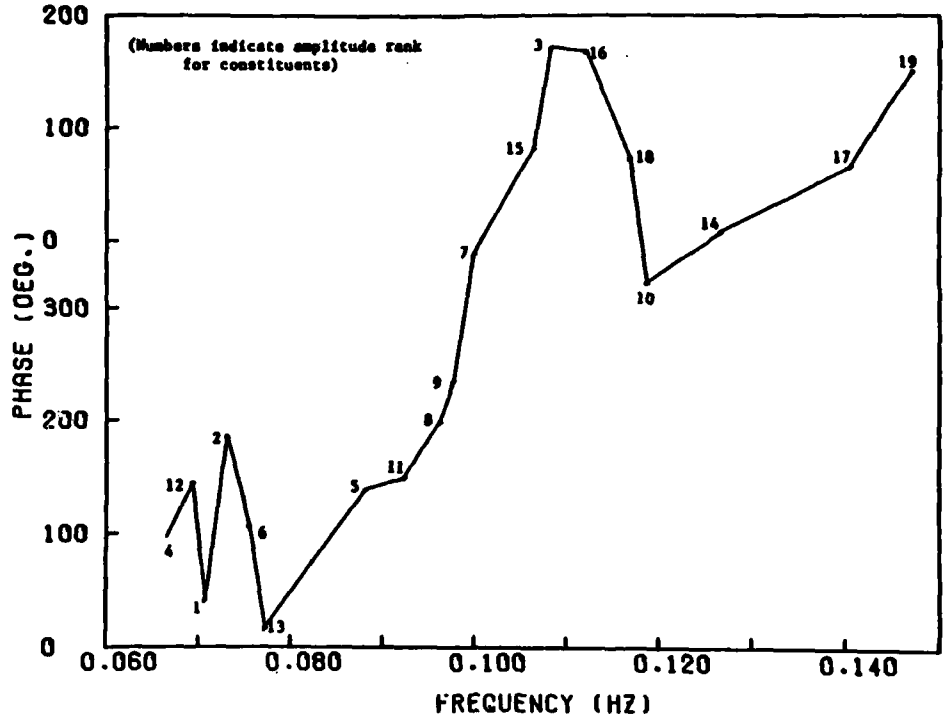

Figure D-8. South Pass, 1500 to 1510 c.d.t., 600-second record analyzed.

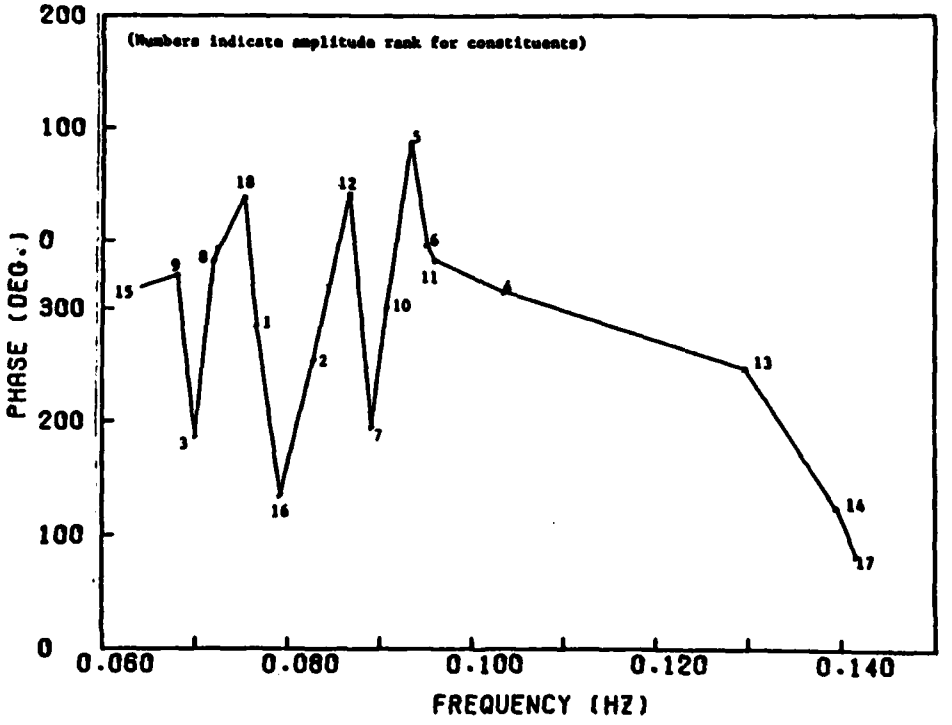

Figure D-9. South Pass, 1510 to 1520 c.d.t., 600-second record analyzed.

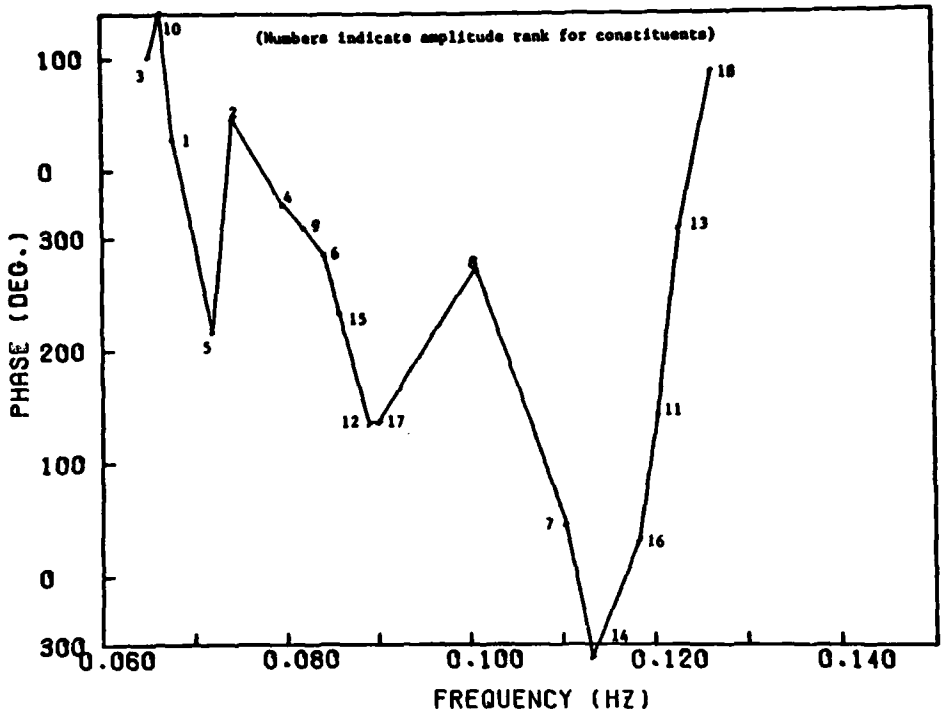

Figure D-10. South Pass, 1520 to 1530 c.d.t., 600-second record analyzed.

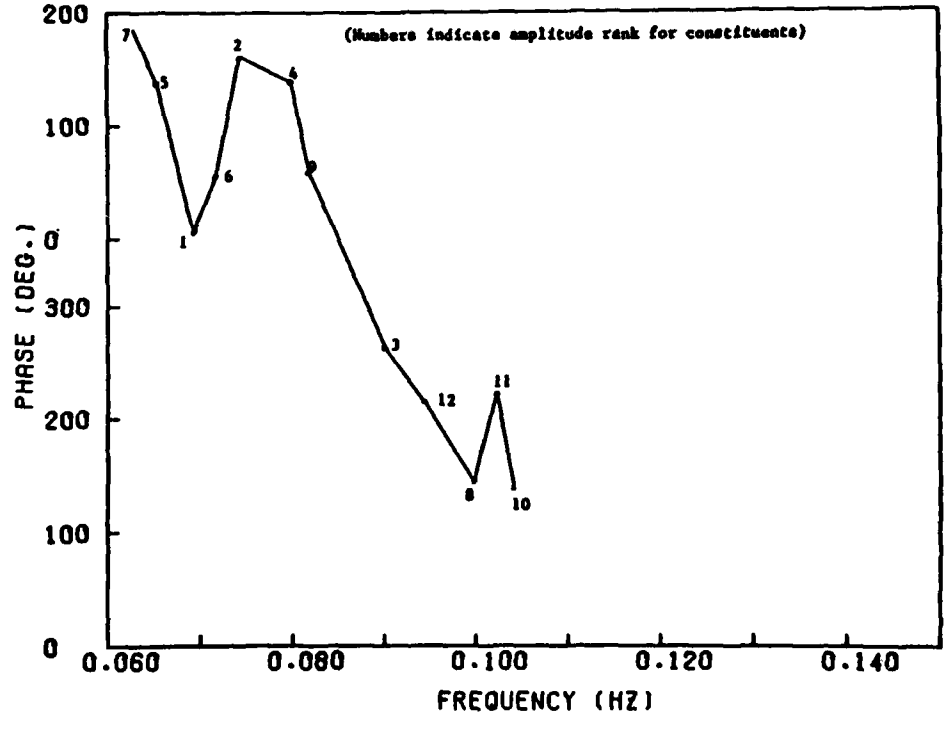

Figure D-11. South Pass, 1530 to 1540 c.d.t., 600-second record analyzed.

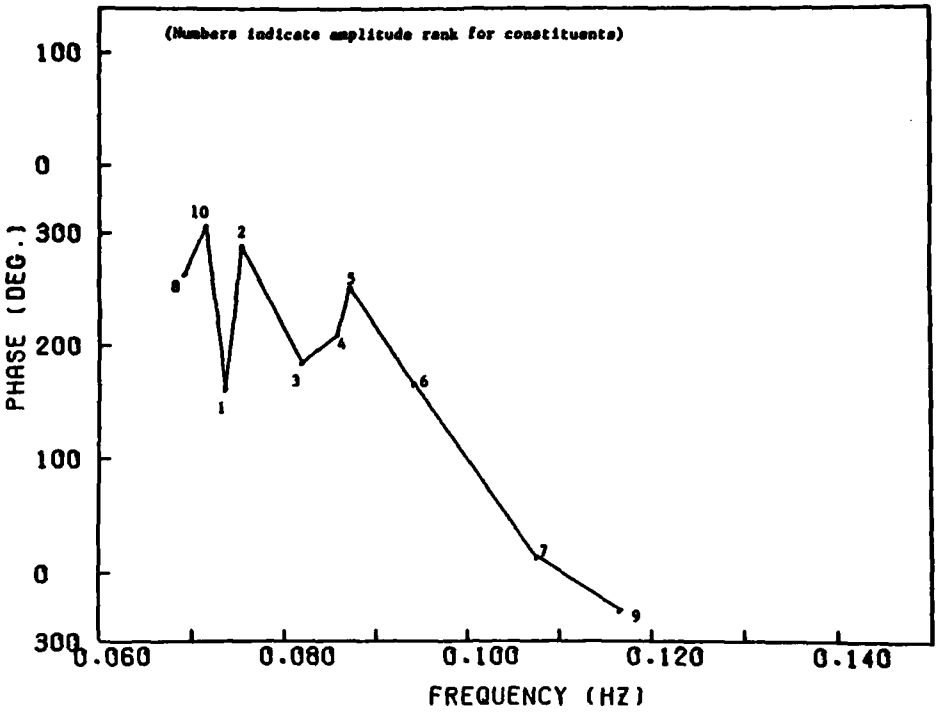

Figure D-12. South Pass, 1540 to 1550 c.d.t., 600-second record analyzed.

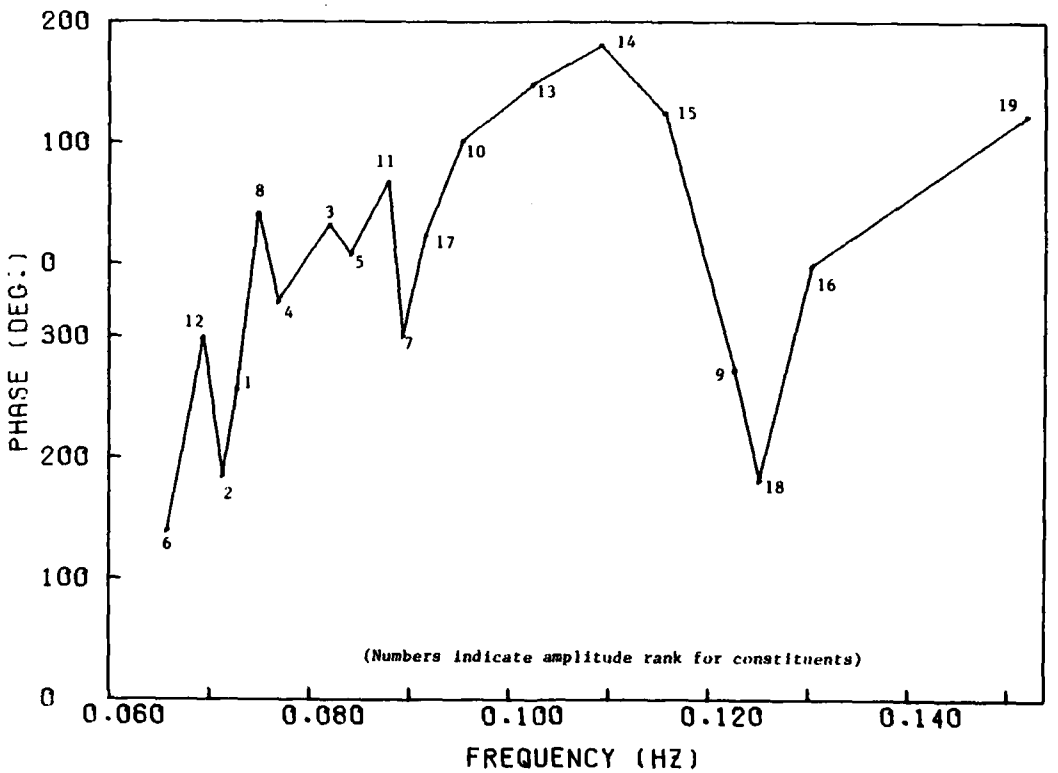

Figure D-13. South Pass, 1550 to 1600 c.d.t., 600-second record analyzed.

APPENDIX E

PLOTS OF MAJOR PEAKS AND VALLEYS IN LOCAL VARIANCE TIME SERIES

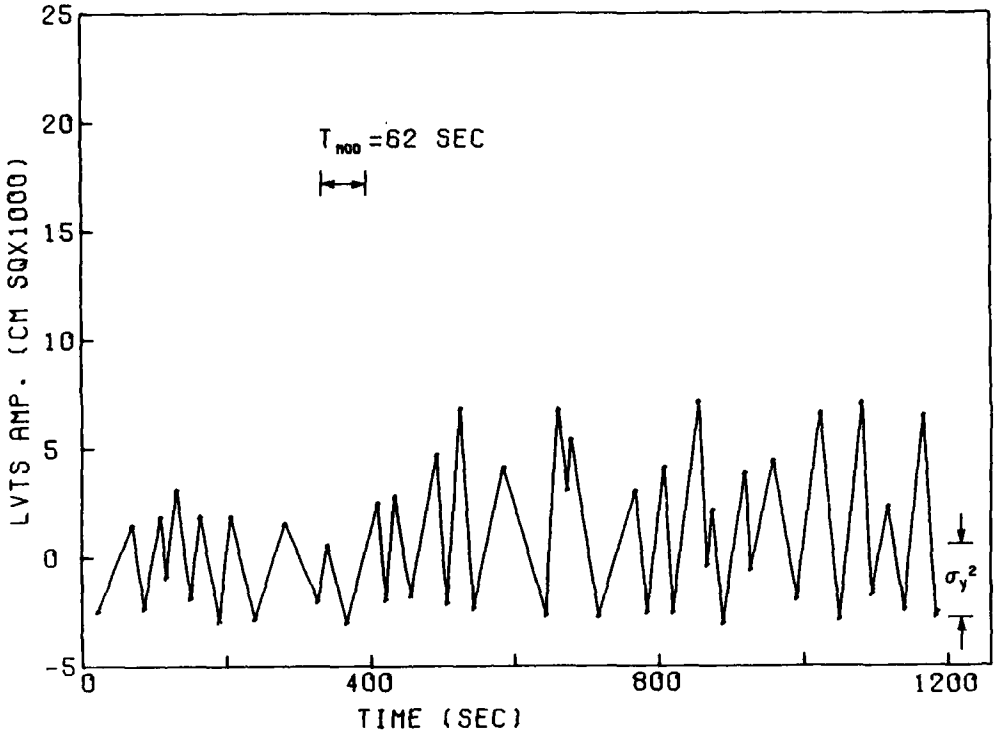

Figure E-1. South Haven, 1700 to 1720 e.s.t., I = 52, G = 0.63.

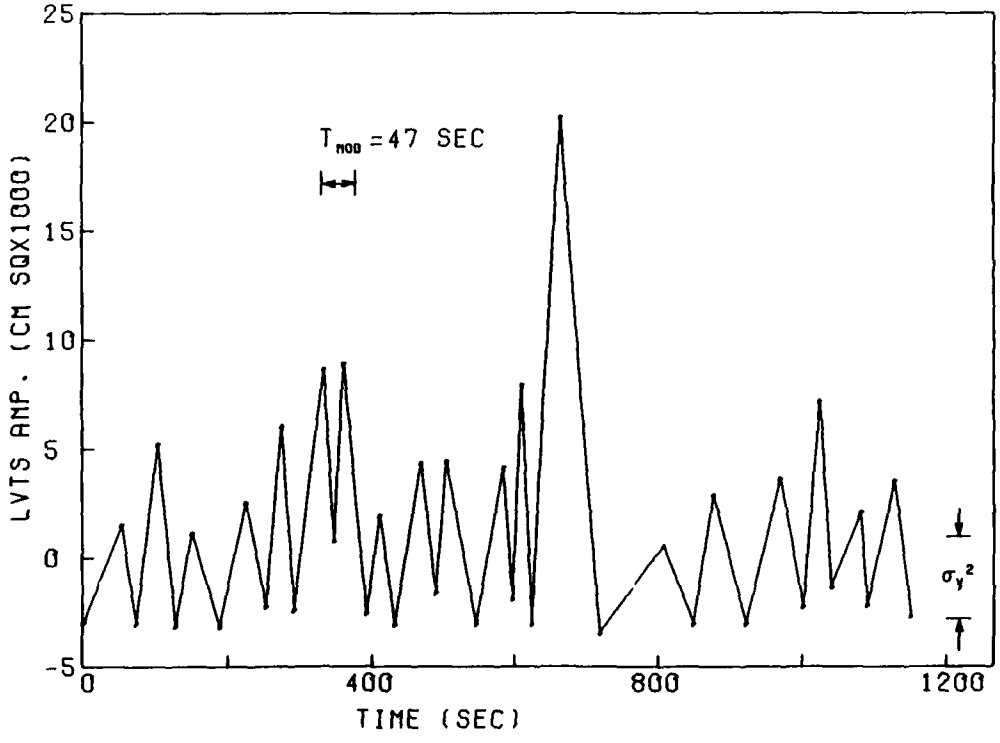

Figure E-2. South Haven, 1720 to 1740 e.s.t., I = 52, G = 0.79.

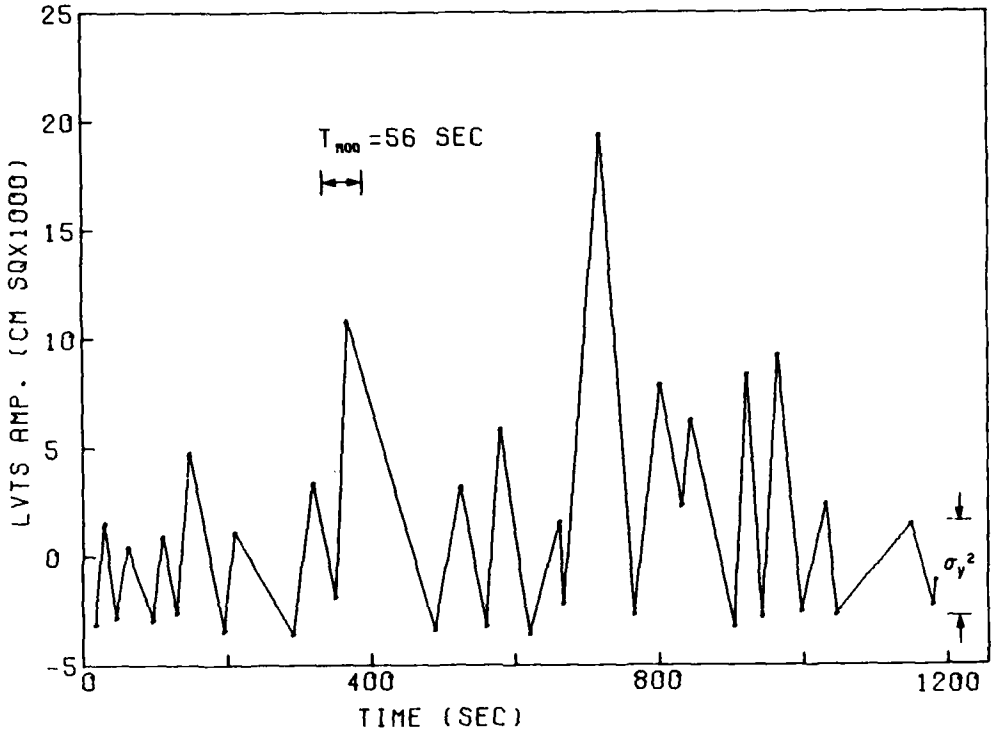

Figure E-3. South Haven, 1740 to 1800 e.s.t., I = 52, G = 0.69.

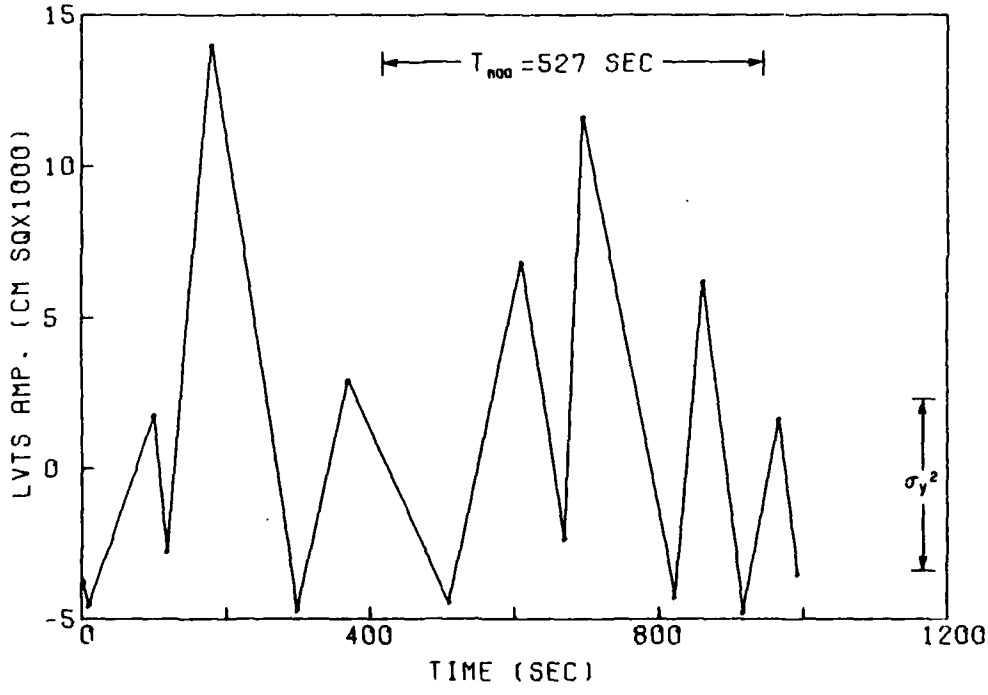

Figure E-4. Columbia Light, 1300 to 1317 P.d.t., I = 60, G = 0.67.

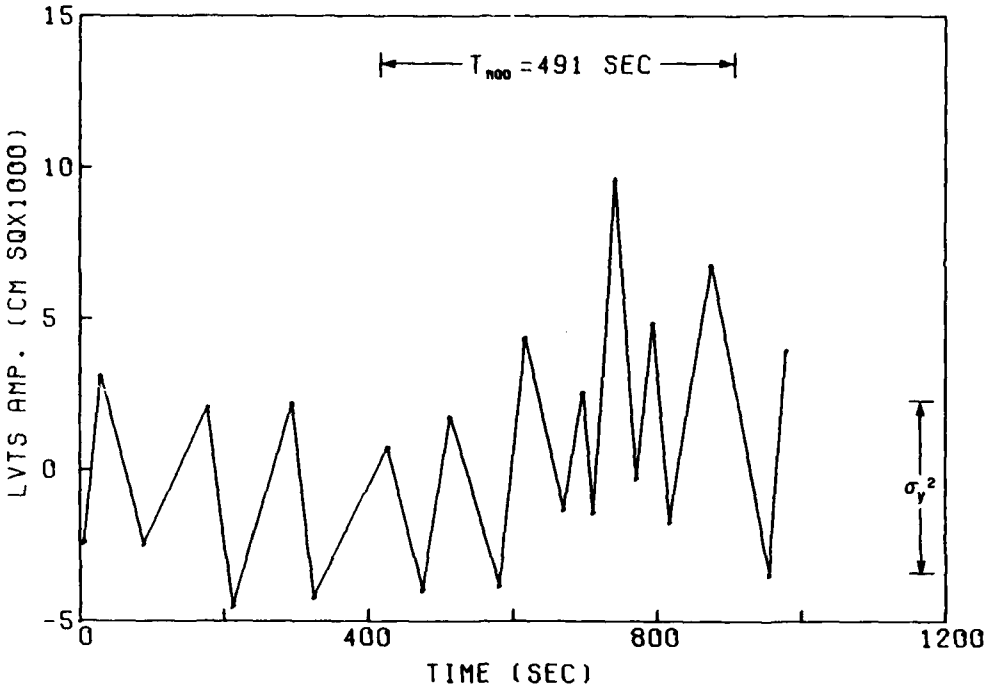

Figure E-5. Columbia Light, 1400 to 1417 P.d.t., I = 60, G = 0.50.

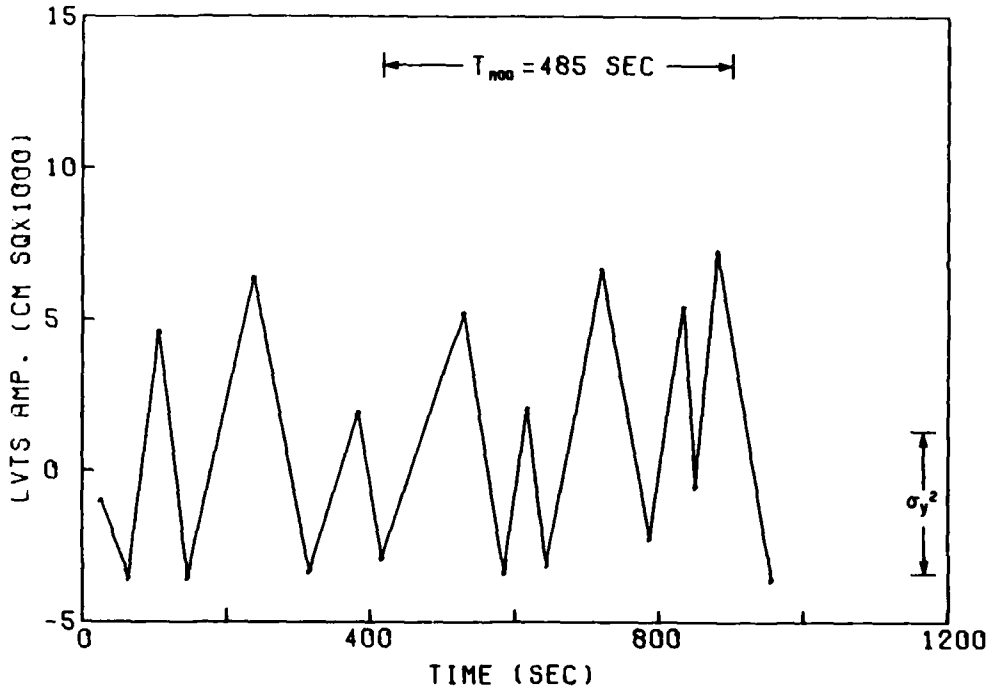

Figure E-6. Columbia Light, 1500 to 1517 P.d.t., I = 60, G = 0.60.

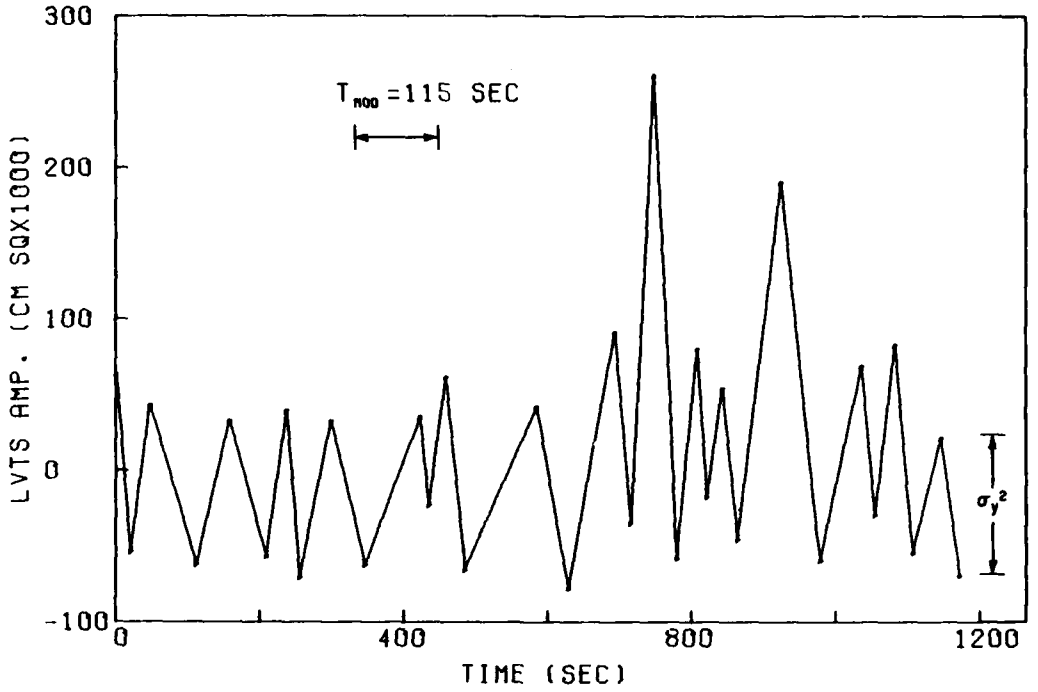

Figure E-7. South Pass, 1500 to 1520 c.d.t., I = 260, G = 0.60.

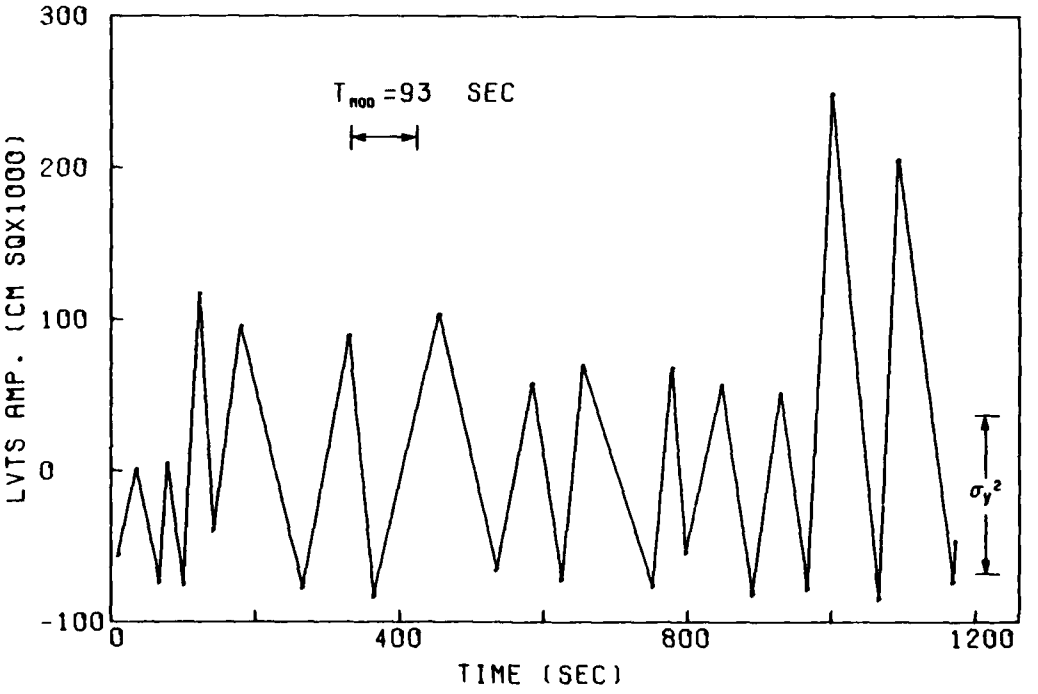

Figure E-8. South Pass, 1520 to 1540 c.d.t., I = 260, G = 0.59.

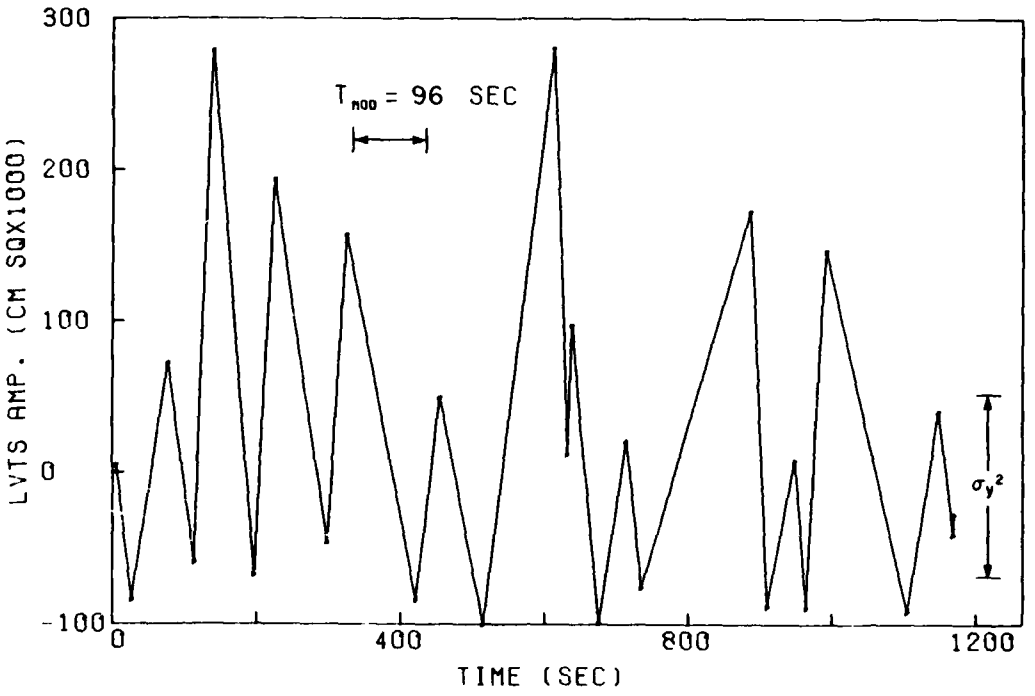

Figure E-9. South Pass, 1540 to 1600 c.d.t., I = 260, G = 0.66.

Thompson, Edward F.
Nonrandom behavior in field wave spectra and its effect on grouping of high waves / by Edward F. Thompson.--Fort Belvoir, Va. : U.S. Army Coastal Engineering Research Center ; Springfield, Va. : available from NTIS, 1982.
[110] p. : ill. : 28 cm.--(Technical report / Coastal Engineering Research Center ; no. 82-2)
Cover title.
"August 1982."
Wave measurements are examined from three relatively deepwater field sites in Lake Michigan, the Pacific Ocean, and the Gulf of Mexico. Approximately 1 hour of data representing high waves, single-peaked spectra, and nearly constant significant heights and peak spectral periods was selected for analysis. The data represent actively growing waves at two sites and swell at the third site.
1. Fourier transformations. 2. Spectral analysis. 3. Wave spectra. 4. Wave height. I. Title. II. Series: Technical report (Coastal Engineering Research Center (U.S.)); no. 82-2.
TC203 .U581tr no. 82-2 627

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TC203 .U581tr no. 82-2 627